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Applicant: Yaacov Almog
Serial No: 10/039,481
Filing Date: January 8, 2002
For: TONER PARTICLES WITH MODIFIED CHARGEABILITY
Enclosures: (1) Appeal Brief (18 pages) (filing in triplicate);
(2) Fee Check in the amount of \$330.00;
(3) Acknowledgement Postcard

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant: Yaacov ALMOG
Serial Number: 10/039,481
Filed: January 8, 2002
For: TONER PARTICLES WITH MODIFIED CHARGEABILITY
Examiner: RODEE, C. D.
Art Unit: 1756

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APPEAL BRIEF

Sir:

Further to a Final Office Action dated July 14, 2003 and a Notice of Appeal filed on October 14, 2003, the following is applicant's brief on appeal.

(1) **Real Party of Interest:** The real party of interest in the present application is Hewlett Packard Corporation (HP), a Delaware corporation. Hewlett-Packard Indigo, BV, the assignee of the patent application, is wholly owned by a subsidiary of HP.

(2) **Related Appeals and Interferences:** None

(3) **Status of claims:**

Claims 30-46 are present in the application. All the claims stand rejected.

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(4) Status of Amendments:

An amendment after final was filed on December 30, 2003. This amendment did not amend the claims but did deal with claiming domestic priority. Entry was refused in an Advisory Action. However, Applicant requests reconsideration of said Amendment since Applicant selected option (A) (no documents) and said priority claim is coextensive with an earlier priority claim to which the Examiner objected. The intent is to have a priority claim appear on the first page of the application (initially numbered page 2) after the title.

(5) Summary of the Invention:

Polymers used to form toner particles for use in liquid toners should have a variety of characteristics in order to work well. These are divided, in the disclosure, into two types of characteristics, namely physical characteristics and chargeability. See for example, page 3, line 36-page 4, line 7.

Unfortunately, many polymers that have desirable physical characteristics do not charge well or at all. See for example, page 4, lines 13-23.

In the past, the art has tried to find a polymer which has a balance of the physical and charging properties desired. In general, the particles had only a single polymer, or possibly, a mixture of polymers which provided this balance. However, such a balance is seldom optimal for both charging and physical properties.

The disclosure describes a method of coating polymer particles having desirable physical characteristics with an ionomer that has the required chargeability. (Succinctly stated at page 6, lines 32 to page 7, line 8.)

Independent claims 30, 32 and 33 define methods of preparing toner particles having the desired characteristics. These claims mainly differ in their degree of specificity to a particular imaging method in which the toner particles are to be used. In general, all of the independent claims describe a method in which pigment particles

that can not be sufficiently charged are dispersed in a liquid to which an ionomer material is added. The ionomer material coats the particles.

(6) Issues:

(i) Are claims 32-46 unpatentable under 35 U.S.C. §112, first paragraph as containing subject matter which was not sufficiently described in the specification?

(ii) Are claims 32-46 unpatentable under 35 U.S.C. §103 (a) as being unpatentable over EP 0 176 630 in view of US 3,325,409 to Whitbread all further in view of Handbook of Imaging Materials to Diamond, US 3,078,231 to Metcalfe and US 3,438,904 to Wagner?

(iii) Are claims 30-44 and 46 unpatentable under 35 U.S.C. §103(a) as being unpatentable over EP 0 176 630 in view of Electrophotography to Schaffert pp 69-73 all further in view of Handbook of Imaging Materials to Diamond, US 3,078,231 to Metcalfe and US 3,438,904 to Wagner?

(iv) Are claims 30-46 unpatentable under the doctrine of obviousness-type double patenting over Claims 13 and 18 - 32 of U.S. Patent No. 6,337,168.

Applicant requested that the Examiner provide his rejections on the art in a single document, as required by MPEP §706.07. The Examiner issued a paper dated December 8, 2003, which made this combination. Applicants, in the following discussion, rely on this paper as the definitive statement of the rejections on the art.

(7) Grouping of the Claims

The claims are grouped as follows, according to the set of arguments relevant for each group of claims. These claims stand or fall together, based on the art cited. While not so indicated, claim 45/30 is not rejected either under 35 U.S.C. §112 or §103.

Group 1	Claims 30, 31, (35, 37, 38, 41, 44)/(30 or 31)	Arguments D, E
Group 2	Claim 36/30	Arguments D, E, G
Group 3	Claim 39/30	Arguments D, E, H
Group 4	Claim 40/30	Arguments D, E, I
Group 5	Claim 42/30	Arguments D, E, J
Group 6	Claim 43/30	Arguments D, E, K
Group 7	Claims 32, (35, 37, 38, 41, 44)/32, 46	Arguments A, C, D, E
Group 8	Claim 34,	Arguments A, C, D, E, F
Group 9	Claim 36/32	Arguments A, C, D, E, G
Group 10	Claim 39/32	Arguments A, C, D, E, H
Group 11	Claim 40/32	Arguments A, C, D, E, I
Group 12	Claim 42/32	Arguments A, C, D, E, J
Group 13	Claim 43/32	Arguments A, C, D, E, K
Group 14	Claim 45/32	Arguments A, C, D, E, L
Group 15	Claims 33, (35, 37, 38, 41, 44)/33	Arguments B, C, D
Group 16	Claim 36/33	Arguments B, C, D, G
Group 17	Claim 39/33	Arguments B, C, D, H
Group 18	Claim 40/33	Arguments B, C, D, I
Group 19	Claim 42/33	Arguments B, C, D, J
Group 20	Claim 43/33	Arguments B, C, D, K
Group 21	Claim 45/33	Arguments B, C, D, L

It is noted that if either of arguments D and E are accepted, then all of the claims in Groups 1-6 are allowable. If neither of these arguments are accepted, then groups 2-6 are allowable, if arguments G-J respectively are accepted.

It is noted that Argument A is relevant to rejection of claims 32 and 46 (and dependent claims) under 35 U.S.C. §112. If argument A is not accepted, then all of groups 7-14 fall. However, if argument A is accepted and any of arguments C, D, E is accepted, then all of groups 7-14 stand. If none of these three arguments are accepted, then groups 8-14 are allowable, if arguments F-L respectively, are accepted.

It is noted that Argument B is relevant to rejection of claim 33 (and dependent claims) under 35 U.S.C. §112. If argument B is not accepted, then all of groups 15-21 fall. However, if argument B is accepted and any of arguments C, D, are accepted, then all of groups 15-21 stand. If neither of these arguments are accepted, then groups 16-21 are allowable, if arguments G-L respectively, are accepted.

(8) Arguments:

Argument A: (Applicable to independent claim 32, to claims 34-45 as dependent on claim 32 and to claim 46.)

Independent claims 32 and 46 state that the toner particles are for use in an electrostatic imaging method, which requires that the toner have a given particle conductivity and that the coating provides to the toner particles a chargeability such that they can be used in the method.

The Examiner contends that this is beyond the scope of the teaching of the disclosure. In the office action dated February 13, 2003, to which the Examiner refers in the final action, the Examiner states that the application only defines particles that are unchargeable and that have little or no utility in practical applications in electrostatic imaging. The Examiner further states that the claims as presented also cover cases where the particles have some utility in (other) electrostatic imaging processes, and thus, the claims are broader than the specification.

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Applicant directs the Board's attention to, Figs. 1-3 and to page 9, lines 8-40, page 10, lines 34-38, and page 12, lines 15-34. As seen in Figs. 1-3, the pigmented core polymer particles used do have some conductivity. As the *Examiner* pointed out in the parent application, the amount of conductivity varies from process to process and that particles with any chargeability can be used in some process. It is clear from Figs. 1-3 and would be clear to a person of ordinary skill in the art, faced daily with this problem, that the invention is concerned with taking toner particles that are somewhat chargeable and increasing their chargeability so that they are usable in a *particular* process. Whether these particles could be used in some other, perhaps theoretical, process is clearly not relevant to the utility as defined by the examples, as this utility would be clear to a person of ordinary skill in the art.

Further, Applicant points out that, as would be appreciated by a person of ordinary skill in the art, an aspect of the invention is that the chargeability or conductivity of toner particles is enhanced by the coating applied. While the uncoated toner particles can, for example, initially have such a low chargeability that the particles are completely unusable in any electrostatic processes, it would be clear to a person of ordinary skill in the art that if the toner particles in the examples had higher levels of chargeability initially, the coated toner particles would have had correspondingly the higher levels of chargeability conferred by the coating. Thus, a person of ordinary skill in the art would understand that the application teaches enhancement of the type claimed in claims 32 and 46, where the particles are to be matched to the requirements of a particular process.

Furthermore, the Examiner, in the final rejection indicated that the claims might cover increases in charge, having the same charge and decreasing the charge. A simple reading of the claims shows that only an increase in the charge is defined, since claims 32 and 46 define the coating as *providing* a sufficient chargeability, indicating that it did not have same without the coating.

Argument B: (Applicable to independent claim 33 and to claims 35-45 as dependent on claim 33.)

Claim 33 is similar to claim 32, except that it is much more explicit that claim 32 as to the characteristics of the core pigmented particles, in that they are defined as being unusable in a given process since they do not charge enough.

Applicant submits that this is exactly what a person of the art would have understood as the utility of the methodology or chargeability increase taught by the disclosure and shown in the figures.

Thus, all of the reasons given in Argument A are applicable to claim 33 as well, except that the argument in the last paragraph of Argument A is moot, in view of the more specific wording of claim 33.

Summary of the cited prior art.

The primary reference is EP 0176 630. The EP publication teaches a method of producing a toner particle for liquid toner, in which a *pigment* is coated with an ionomer. One assumes that the ionomer material had a desired mix of physical properties and chargeability so that the toner particle could be used in an electrostatic imaging process. This is explicitly stated at page 1, lines 25-28.

It is noted that pigments *per se* are not generally used alone as toner particles, since there is nothing in the pigments to adhere them to a substrate. The pigments are either dispersed in a polymer, coated with a polymer or (in some very old systems) dispersed in a polymer that is dissolved in a carrier liquid. In this last system, when the liquid dries, the dissolved polymer attaches to the substrate and entraps the pigment.

The EP reference teaches a pigment that is coated with an ionomer. Clearly, the ionomer has been chosen as a trade-off between chargeability and physical properties as indicated above in the summary of invention and in the referenced portions of the application. The abstract, for example, describes the coated pigment as "acting as toner particles." The objective (and result) of the EP reference is to provide toner particles in

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which the pigment particles are each coated with a polymer (or resin mixture) that give all the desired properties of the toner.

The EP reference describes two different ways to produce the coated pigment. In one method, the coating material is dissolved in the carrier liquid (no temperature is given, so room temperature is assumed) and becomes attached to it. In the other, the coating material is dissolved in the carrier liquid which is evaporated, leaving coated pigment.

Whitbread, a secondary reference in one of the rejections, teaches no more than the standard method of dispersing the pigment in a polymer. It says nothing about a process of forming a pigmented polymer particle and then coating it with an ionomer to impart a desired amount of chargeability. The end result is clearly stated to be a toner particle. (For example, at col. 1, line lines 38-39.) The objective (and result) of the Whitbread reference is to provide a toner particle in which the pigment is dispersed in a polymer to form a toner particle that has all the desired properties of the toner.

The Schaffert document, which is the secondary reference in the other rejection also does no more than teach the prior art methods of making a toner in accordance with the methods described above. Again, a pigment is used together with a binder to form toner particles. The objective (and result) of the Schaffert reference is to provide a toner particle in which the pigment is dispersed in a polymer to form a toner particle that has all the desired properties of the toner.

None of these three references (nor any of the cited references, for that matter) teach *anything* at all about taking a pigmented polymer particle and coating it with a different material to adjust the chargeability. They both define methods of making toner particles, as best they can, in accordance with the prior art, namely, by using a polymer or mixture of polymers to provide the desired properties, both physical and electrical.

The Examiner indicates at the top of page 4 of the clarifying document that "It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the *pigment* of Whitbread as the pigment in the European Document..."

The Examiner has mischaracterized the teaching of Whitbread, which teaches the production of a *toner* and not of a pigment, coated or otherwise. In fact, the method employed by Whitbread might actually result in toner particles that comprise pigment dispersed in polymer particles. There is certainly no teaching in Whitbread of producing a *pigment* and no characterization of the toner produced by Whitbread as being anything other than a toner.

Furthermore, it is noted that none of the three main references say that there is anything lacking in their toner. None of them indicates that adhesion is poor, and none indicates a lack of chargeability. Of course, some at least discuss the factors that effect chargeability, but always in the context of choosing a proper toner polymer.

Argument C (Applicable to claims 32, 33 and 46 and claims dependent therefrom.)

This argument is applicable to the rejection of claims 32-46 in view of 5 publications. Applicant submits that the Examiner has not provided a *prima facie* case of lack of patentability. The basic act in independent claims 32, 33 and 46 is the coating of *pigmented polymer particles* with an ionomer. The cited prior art never coats anything other than a pigment with anything, let alone with an ionomer. A person of the art, having all the cited art available would not have found any motivation in coating the finished *toner* particles of Whitbread, which are usable *as is* as toner particles, with anything and certainly not with the ionomer of the EP publication, which is described therein as being used to coat *pigment* which must be treated somehow to be used as a toner. The Examiner has indicated that it would be obvious to coat a particle that is already suitable for use as a toner with another material, based on a reference that defines use of such coating only with respect to

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pigment which is not generally usable as a toner particle. Applicant respectfully submits that the Examiner is wrong.

Applicant submits that the Examiner has taken two acts, which are never combined in the prior art, because there is neither a perceived need nor an actual need to do so, and combine them based solely on the teaching of the present application. The prior art cited contains no teaching of separating the functions of charging from the physical properties of toner particles by coating the particles with an ionomer. Applicant notes, although this is certainly not definitive, that the Examiner has needed 5 references to find the present claims obvious. While the Examiner is not limited in the number of references used, in the present case, in which the idea is so simple (with hindsight) the use of many references calls into serious question their *obvious* combination. This is especially true in an active field such as the present one and the age of the references.

Argument D (Applicable to claims 30, 32, 33 or 46 and claims dependent therefrom.)

This argument is applicable to the rejection of claims 30-44 and 46 in view of 5 publications. It is essentially similar to the rejection discussed in Arguments C, except that the Electrophotography volume to Schaffert replaces the Whitbread reference. In essence, the Examiner utilizes Schaffert as motivation to coat pigmented polymer particles with an ionomer to improve chargeability. All of the elements assigned by the Examiner to Schaffert are there.

The inference that the combination would be obvious is, however, not correct. The Schaffert reference, as with all the other cited references, teaches that a useful toner particle is produced by providing a polymer coating or polymer based dispersion media for the pigment which polymer has all the necessary attributes for toner particles, physical and electrical.

In essence, the Examiner has indicated that the prior art somehow makes the coating of a toner particle to be an obvious act. However, there is no hint of doing so anywhere but in the present application.

Argument E (Applicable to claims 30, 32 and 46 and claims dependent on claim 30 and 32.)

The Examiner has not provided a *prima facie* case of unpatentability with respect to claims 30, 32 and 46. Claims 30, 32 and 46 require that the ionomer not be soluble at room temperature. In the Examples of the EP publication, the ionomer is soluble at the temperature of preparation, which is not given and can be assumed to be room temperature.

Argument F (Applicable to claim 34.)

The Examiner has not provided a *prima facie* case of unpatentability with respect to claim 34. Claim 34 claims a coating method which is completely different from that of the EP reference. In claim 34, the ionomer is heated to make it dissolve and then cooled so that it coats the toner particles. The methods described in the EP reference (as discussed above in the discussion of the prior art) is completely different.

Argument G (applicable to claim 36)

The Examiner has not provided a *prima facie* case of unpatentability with respect to these claims, since the EP reference, the only source of the cited ionomer coating, does not teach an ionomers, based on the claimed acid.

Argument H (Applicable to claim 39)

The Examiner has not provided a *prima facie* case of unpatentability with respect to these claims, since the EP reference, the only source of the cited ionomer coating, does not teach an ionomers, based on the claimed acid.

Argument I (Applicable to claim 40)

The Examiner has not provided a *prima facie* case of unpatentability with respect to these claims, since the EP reference, the only source of the cited ionomer coating, does not teach an ionomers, based on the claimed acid.

Argument J (Applicable to claim 42)

The Examiner has not provided a *prima facie* case of unpatentability with respect to claim 42. Claim 42 requires the coating to be less than 10% of the particle weight. The coatings in the EP reference (which is the only reference with coating of any kind) is 20%. Since the coating does not necessarily have good physical properties, reducing the coating thickness is desirable.

Arguments K (Applicable to claim 43)

The Examiner has not provided a *prima facie* case of unpatentability with respect to claim 43. Claim 43 requires the coating to be less than 5% of the particle weight respectively. This is even lower than that provided in claim 42. The coatings in the EP reference (which is the only reference with coating of any kind) is 20%. Since the coating does not necessarily have good physical properties, reducing the coating thickness is desirable.

Argument L (applicable to claims 45/32 and 45/33.)

The Examiner has not made a *prima facie case* of obviousness with respect to claim 45. As indicated above, claim 45/30-31 appears to be allowed. As to the other dependencies of claim 45, this claim claims specific values of pre-coating conductivity that are not taught by the prior art.

As to Issue (iv), Applicant is submitting a Terminal Disclaimer under separate cover.


(9) Conclusion

None of the claims are anticipated and all of the claims are patentable in view of the prior art cited.

In view of the above arguments, applicant respectfully requests that the Board reverse the ruling of the examiner and allow all the claims.

Applicant attaches an appendix of the claims under appeal.

Respectfully submitted,
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April 26, 2004

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Appendix - Claims under Appeal

30. A method for preparing a liquid toner for electrostatic development of electrostatic images, which method comprises:

- dispersing pigmented particles in an insulating non-polar liquid;
- mixing at least one ionomer, which is not soluble at room temperature, with the liquid containing pigmented polymer particles;
- coating the pigmented polymer particles with the at least one ionomer; and
- adding at least one charge director to the liquid containing the coated pigmented polymer particles

wherein the pigmented polymer comprises a material suitable for use as a toner material in an electrostatic image development application, but which in the presence of charge director alone is unchargeable or not chargeable to an extent suitable for electrostatic development of electrostatic images and

wherein the at least one ionomer is used in an amount effective to impart enhanced chargeability to the toner particles to an extent that the particles can be used to develop an electrostatic image.

31. A process for electrostatic development of electrostatic images which comprises:

- forming a charged latent electrostatic image on a photoconductive surface;
- applying to the charged surface charged particles from a liquid toner prepared according to the method of claim 30; and
- transferring the resulting toner image to a substrate.

32. A method for producing a liquid toner for an electrostatic imaging method, which method requires that said toner particles comprise toner particles having a given particle conductivity, said method for producing a liquid toner comprising:

dispersing pigmented particles in an insulating non-polar liquid to form a dispersion;

mixing at least one ionomer which is not soluble at room temperature with the dispersion to form a mixture;

coating the pigmented polymer particles with the at least one ionomer; and

adding at least one charge director to the mixture,

wherein said coating provides to said particles a chargability sufficient to give said toner particles said given particle conductivity.

33. A method for preparing a liquid toner for a particular process of electrostatic development of electrostatic images, said particular process requiring a given level of toner charge, the toner comprising chargeable toner particles dispersed in a carrier liquid and at least one charge director, the method comprising:

providing at least one charge director;

providing a toner precursor material comprising toner precursor particles dispersed in an insulating non-polar carrier liquid, the particles comprising a core material including a pigmented polymer suitable for use as a toner material in the particular process for electrostatic development of electrostatic images, but which is unchargeable by the at least one charge director or which is weakly chargeable by the at least one charge director to an extent that it is not useable in electrostatic development of latent images in the particular process;

coating the toner precursor particles with at least one ionomer component in an amount effective to impart enhanced chargeability to the pigmented polymer to an extent that the coated particles can be used to develop a latent electrostatic image in the particular process for electrostatic development of electrostatic images, thereby forming said chargeable toner particles, and

adding said at least one charge director, in an amount suitable for charging the chargeable toner particles to said given level.

34. A method according to claim 32, wherein the at least one ionomer is first heated to a temperature at which the at least one ionomer dissolves in the carrier liquid and then is cooled to a temperature where the at least one ionomer is not soluble in the carrier liquid, thereby coating the particles with the at least one ionomer.
35. A method according to any of claims 30-33 wherein the particles are pigmented synthetic resin particles.
36. A method according to any of claims 30-33 wherein the at least one ionomer is carboxylic acid based and neutralized with metal salts forming ionic clusters.
37. A method according to any of claims 30-33 wherein the at least one ionomer is methacrylic acid based and neutralized with metal salts forming ionic clusters.
38. A method according to any of claims 30-33 wherein the at least one ionomer is sulfonic acid based and neutralized with metal salts forming ionic clusters.
39. A method according to any of claims 30-33 wherein the at least one ionomer is phosphoric acid based and neutralized with metal salts forming ionic clusters.
40. A method according to any of claims 30-33 wherein the at least one ionomer is ethelene acid based and neutralized with metal salts forming ionic clusters.
41. A method according to any of claims 30-33 wherein the coating comprises less than 20 percent by weight of the particles.

42. A method according to any of claims 30-33 wherein the coating comprises less than 10 percent by weight of the particles.

43. A method according to any of claims 30-33 wherein the coating comprises less than 5 percent by weight of the particles.

44. A method according to any of claims 30-33 wherein the coating comprises a thickness of greater than 0.02 micrometers.

45. A method according to any of claims 30-33, wherein the pigmented polymer particles are chargeable by the at least one charge director to less than about 7 pmho/cm, in the absence of said coating.

46. A method for producing a liquid toner for an electrostatic imaging method which requires that said toner comprise toner particles having a given particle conductivity, said method for producing a liquid toner comprising:

dispersing pigmented polymer particles in an insulating non-polar carrier liquid to form a dispersion;

mixing at least one ionomer which is not soluble at room temperature with the dispersion to form a mixture;

coating the polymer particles with the at least one ionomer; and

adding a charge director to said mixture,

wherein said coating provides to said polymer particles a chargeability sufficient to impart said toner particles particle conductivity to the extent that said particles can be used to develop a latent electrostatic image in the electrostatic imaging method.